Big Data Education for the Masses: MOOCs, Modules, & Intelligent Tutoring Systems

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Grant Number: 1R25EB020378-01

Biomedical science, higher education, software and technology are simultaneously undergoing tectonic shifts. The amazing pace of software and technological development are driving equally amazing advances in the ability to acquire massive data sets in the biomedical sciences. These new Big Biomedical data sets come in the form of complex measurements, such as that of the brain, genome, proteome and human biome or massive databases, such as with electronic health records. Big Data issues, such as reproducibility of processing, measurement and analysis techniques, are increasingly complex, and crucial. Across all domains there is a knowledge gap of researchers to analyze and interpret these new data sets and the current higher education model cannot meet the insatiable demand for this training. We propose to make substantial progress on these issues in two domains. Specifically, we propose to use Massive Open Online Courses (MOOCs) to create two series, one in neuroimaging and one in genomics. These series will allow for flexible, student paced, low cost scalable training for tens of thousands of students. Along with these series, we propose the creation of modular Big Data biostatistical content that can be used by students as well as teachers. This effort will be parallel to work on an intelligent tutoring syste called swirl. This application proposes to use swirl to create rich, gamified learning environments for students. All of the material created from this grant will be open access and free. PUBLIC HEALTH RELEVANCE: Project narrative: We propose two Massive Open Online Course series in neuroimaging and genomic Big Data analysis as well as the creation of modular Big Data statistics content and content creation for an intelligent tutoring system.